

SITE PLAN  
FOR  
**CLOSURE OF THE U.S. ARMY CHEMICAL AGENT MUNITIONS DISPOSAL  
LEWISITE TEST PROCESSES**

SITE PLAN NO. 91-01  
22 JANUARY 1997

RONALD T. PAYEUR  
MAUREEN M. MULHALL (REDCON)

**UNITED STATES ARMY  
CHEMICAL AGENT MUNITIONS DISPOSAL SYSTEM ACTIVITY  
DESERET CHEMICAL DEPOT  
TOOELE, UTAH 84074**

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**SUBMITTED BY:**

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DATE

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\_\_\_\_\_  
DATE\

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**SECTION I. INTRODUCTION.**

**1. BACKGROUND.**

a. The U.S. Government Code of Federal Regulations (40 CFR), Part 264, Subpart G details the requirements of all Resource Conservation and Recovery Act (RCRA) closure activities. Subpart G states all closures will be detailed in a closure plan.

b. This closure plan is written specifically for the U.S. Army Chemical Agent Munitions Disposal System Activity (USACAMDS) Lewisite Agent neutralization and waste stabilization process. Policies, objectives, history, and Quality Assurance Branch activities designed to achieve closure of the Lewisite disposal process are presented in this closure plan.

c. Chem-Security, Ltd. is the prime contractor for the USACAMDS test involving Lewisite neutralization to be conducted at Deseret Chemical Depot (DCD). The subcontractor CEntry Constructors and Engineers in Salt Lake City, Utah are providing the neutralization equipment design.

d. The stabilization portion of the process will be supplied by a contractor (details will be supplied when available).

e. All applicable State of Utah environmental and 40 CFR requirements will be met.

**2. OBJECTIVE.**

Complete the chemical agent Lewisite neutralization process by decontaminating and cleaning equipment, materials, and facilities used in the neutralization and stabilization of chemical agent Lewisite. Equipment, materials, and facilities will be ascertained to be agent free (to the 3X level) by sampling and analysis.

## **SECTION II. SAFETY CRITERIA.**

**1. SAFETY PRECAUTIONS.** Safety precautions for all closure personnel or employees in the immediate test area shall follow safety rules observed for normal operation of mechanical and electrical equipment. Chemical safety devices (i.e., protective masks and protective clothing) will be used in accordance with Standing Operating Procedures (SOP) for the specific area.

**2. SAFETY REQUIREMENTS.** Safety requirements shall be emphasized to all personnel involved in machinery and equipment operations before start of operation. Casual visitors and other personnel not required for closure operations shall be discharged from the immediate area during operations. Need-to-know visitors shall be controlled in the observation and control module area.

**3. SAFETY TRAINING.** All personnel involved in handling and moving hazardous waste will be trained according to Occupational Safety and Health Administration (OSHA) and USACAMDS safety and environmental requirements.

### SECTION III. CLOSURE PROCEDURES.

#### 1. PREPARATION.

- a. All safety and environmental approvals and permits shall be obtained prior to start of the closure procedures.
- b. All closure procedures shall be in accordance with applicable standing operating procedures
- c. The estimated quantities of materials to be stabilized by the Stabilization Contractor are shown in Table 1.
- d. Auxiliary Test Facility (ATF). Figure 1 shows the proposed layout of the ATF.

**TABLE 1. ESTIMATED MATERIALS FOR STABILIZATION**

Material	Estimated Amount to be Treated (pounds) <sup>(1)</sup>
Neutralization Solution (liquid)	220,000
Decontamination Solution (liquid)	140,000
Carbon	9,000
Ton Containers	19,600
Cleaning Materials	1,000
Demilitarization Protective Ensemble (DPE)	1,800
Equipment/Tanks	150,000
Monitoring/Laboratory Materials	10,000

<sup>1</sup> The amount of actual material generated could be more or less than indicated in Table 1 depending on the actual amount of waste generated during Lewisite neutralization and agent decontamination operations.

#### 2. PROCEDURES.

- a. All equipment and facilities will be decontaminated to at least a 3X level. An item is designated 3X when the surface is decontaminated by locally approved procedures, contained, and all appropriate tests or monitoring verify vapor concentration does not exist equal to or greater than ( $\geq$ ) 1.0 time weighted average (TWA).

b. Equipment shall be collected and processed in accordance with approved cleanup procedures. Equipment in the ATF may remain in place for future USACAMDS testing. If ATF equipment is removed, it will not be moved until decontaminated and rinsed according to approved procedures. Table 2 lists the equipment located in the ATF.

(1) Demilitarization Protective Ensemble (DPE) suits will be monitored for Lewisite. If Lewisite levels  $\geq 1.0$  TWA are detected, the DPE will be decontaminated in accordance with current SOP. The DPE suits will then be stabilized for arsenic prior to disposal in a landfill.

(2) Ton containers.

(a) Ton containers interior surfaces will be monitored for Lewisite. Ton containers will be cleaned with high pressure water and monitored. If readings are not less than ( $<$ )1.0 TWA, hydrogen peroxide (15% standard grade) and water will be used to clean the containers. This will continue until readings are  $< 1.0$  TWA.

(b) Exterior surfaces will be monitored for Lewisite. If Lewisite is detected  $\geq 1.0$  TWA the exterior surface will be decontaminated with an 18% sodium hydroxide solution until levels drop below 1.0 TWA.

(c) Ton containers will be disposed of in a manner consistent with the level of analyzed arsenic contamination. Ton containers with unacceptable arsenic levels will be stabilized. Ton containers without arsenic or Lewisite may be processed through the Metal Parts Furnace, certified 5X, and recycled to a metal recovery operation. USACAMDS will determine final disposition later.

(3) Monitoring wastes will be stabilized. If initial Lewisite concentrations are not  $< 0.002$  milligrams per milliliter ( $< 2000$  nanograms per milliliter), the Drinking Water Standard (DWS) for Lewisite, a sodium hydroxide solution will be added to the monitoring wastes until they are less than the DWS.

(4) Neutralization facility plastic interior envelope. The plastic interior envelope will be monitored for Lewisite. If levels of Lewisite are  $\geq 1.0$  TWA, the envelope will be decontaminated with a 18% sodium hydroxide solution until readings are  $< 1.0$  TWA. The envelope will be stabilized.

(5) Activated carbon. Activated carbon from filters and process will be changed at the completion of processing and cleanup. The activated carbon will be monitored for the presence of Lewisite. Final disposition of the activated carbon has not been determined.





**TABLE 2. AUXILIARY TEST FACILITY EQUIPMENT**

Equipment Number	Equipment Description	Material
E-110	Cold Exchanger	carbon steel shell; Polytetrafluoroethylene (PTFE) tubes
E-120	Hot Exchanger (Heat Exchanger)	carbon steel shell; PTFE tubes
F-120	Phase I Vent Gas Filter	activated carbon bed in carbon steel canister
F-130	Phase II/III Vent Gas Filter	2-stage activated carbon bed in carbon steel canister
M-110	Static Mixer-Cooled Process Line	carbon steel shell
5M-120	Static Mixer-Neutralization Agent Line	carbon steel shell, glass filled PTFE element
M-130	Static Mixer- Recycle Line	carbon steel shell, glass filled TEF element
P-170	Pump-Neutralized Product Transfer	pneumatic, double diaphragm; PVDF wetted components
P-140 A/B/C	Pumps- Reactor Circulation (3)	pneumatic, double diaphragm; PVDF wetted components
P-150	Pump-Heating Media Circulation	pneumatic, double diaphragm; PVDF wetted components
P-180	Pump-Decontamination Fluid	pneumatic, double diaphragm; PVDF wetted components
P-190A/B	Pump- Cooling Media (2)	pneumatic, double diaphragm; polypropylene wetted components
PV-110	Reactor	PTFE lined with PTFE spray nozzle
PV-120	Catalytic Reactor	carbon steel; PTFE lined; Contains manganese dioxide catalyst on monolithic honeycomb substrate
PV-130	Vent Gas Knockout Drum	carbon steel; PTFE lined; Kynar demister pad
T-160	Cooling Medium Tank	carbon steel
6T-150	Heating Media Tank	carbon steel
T-130	Neutralized Product Storage Tank	carbon steel, PTFE lined
T-140	Decontamination Fluid Storage Tank	carbon steel
Piping		PTFE lined

(6) Catalyst from Lewisite processing will be monitored for Lewisite prior to removal and stabilized.

(7) Closure Washdown and Decontaminants. Closure washdown and decontaminants will be collected and managed in the ATF sumps [para 2.c.(2)].

c. ATF.

(1) If equipment remains in the ATF, it must be decontaminated to at least a 3X level.

(2) The ATF will be monitored and samples taken from the floor and walls. The samples will be analyzed for Lewisite. Equipment (pipes and pipe components) remaining in the facility will be decontaminated to 3X. If the ATF is  $\geq 1.0$  TWA, the decontamination process must continue until the ATF is monitored  $< 1.0$  TWA.

(3) Sumps.

(a) A representative sample will be taken from the sump and analyzed for Lewisite. The sample results must be less than the DWS. If the sample is above the DWS, additional decontamination solution, 18% sodium hydroxide, will be added to the sump and sampling repeated. This procedure will be repeated until the agent concentration level is less than the DWS.

(b) The solution in the sumps will be stabilized.

d. Items used in the cleanup operation will be stabilized after being monitored to  $< 1.0$  TWA.

### **3. MONITORING AND DATA COLLECTION.**

a. Monitoring.

(1) 3X (Below 1.0 TWA) Certification. The MINICAMS<sup>7</sup> and Bubblers will be used to monitor the ATF and the ventilation system.

(a) When decontamination of the ATF is completed, 3X certification with ventilation will be initiated. The ventilation system will operate at the same airflow and differential pressure required during chemical agent operations.

(b) The Bubbler sampling point will be in the main exhaust duct of the facility (process area). The temperature of the ATF will be above 70° F during Bubbler sampling. If the Bubbler result is positive (agent levels  $\geq 1.0$  TWA) decontamination procedures and monitoring will be repeated as required. If the Bubbler result is negative (agent levels  $< 1.0$  TWA), the established 3X Bubbler monitoring procedures can be started. When three successive Bubbler results are negative ( $< 1.0$  TWA), the facility can be certified 3X by Quality Assurance Branch, Safety Branch, and Surveillance. The ventilation will then be turned off and the facilities will be monitored using three successive twelve hour Bubblers. If one Bubbler's monitoring results are positive ( $\geq 1.0$  TWA), decontamination procedures and monitoring are to be repeated as required, with ventilation.

(c) The Safety Branch will review cleanup operations and check monitoring data to verify that cleanup operations complied with established safety requirements. Quality Assurance Branch, Safety Branch, and Surveillance will sign the 3X Certification of Decontamination Sheet (Appendix B). Completion of this sheet certifies the facility and associated equipment 3X.

(2) Arsenic monitors will be used to monitor the ATF airborne arsenic levels. Airborne arsenic concentration must remain  $< 0.01$  milligrams per cubic meter ( $\text{mg}/\text{m}^3$ ).

b. Sampling. Samples will be taken and analyzed for arsenic. The analytical method will be the most current in SW-846, *Test Methods for Evaluating Solid Waste*, at the time of closure (currently Method No. 7061). Arsenic levels above 5.0 milligrams per liter ( $\text{mg}/\text{L}$ ) identify the material/equipment as a hazardous waste. The Occupational Safety and Health Agency exposure limit for arsenic is 0.01 milligram per cubic meter ( $\text{mg}/\text{m}^3$ ).

c. Data Collection.

(1) Two decontamination data forms (Appendix B) will be used to document the decontamination of the ATF.

(2) Log books will be maintained by the data collector, ATF Operator, and the Operator in the Control Module.

#### **4. DISPOSITION.**

a. The Stabilization Contractor will be responsible for disposing of all equipment, solution, and material transferred to him in accordance with contract requirements. The contractor will dispose of:

- (1) Neutralized solution from the sumps.
- (2) Metals (e.g., ton containers and processing equipment), as required.
- (3) Monitoring wastes.
- (4) DPE suits.
- (5) Neutralization facility plastic interior envelope.
- (6) Cleaning Materials.
- (7) Catalyst.

b. Ton containers will be cleaned until acceptable for disposal.

c. The ATF and equipment remaining in the ATF will be certified 3X and may remain in place for future USACAMDS testing.

d. A preliminary schedule for closure is given in Appendix A.

e. Within 60 days of completion of closure, submit by USACAMDS Risk Management and Quality Assurance Division to the Regional Administrator, by registered mail, a certification that the facility has been closed in accordance with the specifications in the approved closure plan. The certificate must be signed by the USACAMDS Commander and by an independent registered professional engineer.

**APPENDIX A**  
**PRELIMINARY CLOSURE SCHEDULE**

PRELIMINARY CLOSURE SCHEDULE			
Phase	Management Unit	Unit Closure Time (days)	<sup>(1)</sup> Total Closure Time (days)
I	Ton Container Cleaning and Monitoring	20	30
	Ton Container Sampling and Disposal	20	
II	Process Filters - Activated Carbon Removal and Disposal	4	42
	Catalyst Removal, Decontamination, Monitoring and Disposal	2	
	ATF Equipment Decontamination and Monitoring	4	
	ATF Equipment Sampling, Removal, and Disposal	24	
	ATF Interior Envelope Decontamination and Monitoring	2	
	ATF Interior Envelope Removal and Disposal	4	
	ATF Preliminary Decontamination and Monitoring	2	
III	Sump Decontamination, Monitoring, and Liquid Disposal	4	12
	ATF and Sump Sampling, Cleanup, and Liquid Disposal	8	
IV	ATF 3X Procedures	6	6
V	DPE Suit Monitoring and Disposal	8	16
	Cleaning Material Monitoring and Disposal	4	
	Laboratory and Monitoring Waste Disposal	4	
VI	Stabilization Facility Initial Cleanup and Liquid Disposal	8	28
	Stabilization Equipment Removal and Disposal	12	
	Stabilization Facility Final Cleanup	8	

<sup>1</sup>. Total time for closure may not equal a sum of the unit closure days because some actions will occur simultaneously.

## **APPENDIX B DATA FORMS**



**INDEX OF FORMS**

<u>FORM</u>	<u>TITLE</u>	<u>PAGE</u> <u>NO.</u>
1.	DECONTAMINATION SHEET .....	B-2
2.	3X CERTIFICATION OF DECONTAMINATION SHEET .....	B-3

# DECONTAMINATION SHEET

USACAMDS BUILDING BLOCK\_\_\_\_\_

1. Started cleanup: Date: \_\_\_\_\_ Time: \_\_\_\_\_

2. Decontaminant used: \_\_\_\_\_ Decontamination Solution: \_\_\_\_\_  
Concentration: \_\_\_\_\_

3. Area decontaminated: \_\_\_\_\_

4. Problems encountered: \_\_\_\_\_

---

---

5. Finished cleanup (3X Certification):      Date:\_\_\_\_\_      Time:\_\_\_\_\_

6. Number of attempts before 3X Certification was achieved: \_\_\_\_\_

7. Total manhours to cleanup area: \_\_\_\_\_

8. Description of decontamination method(s) used: \_\_\_\_\_

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CERTIFICATION OF WORK PERFORMED:

PLANTS DIVISION REPRESENTATIVE

# FORM 1

### 3X CERTIFICATION OF DECONTAMINATION

**STATION NUMBER**

**BUILDING BLOCK**

**STATION DESCRIPTION**

**Type of Agent**

**Agent Value**

1. Initial 12-hour DAAMS to terminate area DECON (results must be less than one TWA or less than LOQ at end DECON of area.

*Date DAAMS Sampled*

*Sample Time*

*Results*

2. Monitoring at high area temperature. Temperature to be above 70, area ventilation to be on. Area to be monitored by three consecutive 12 hour DAAMS. All results are to be less than one TWA.

DAAMS

DATES

TIME

RESULTS

WORK AREA TEMP

1.

2.

3.

3. When above requirements are met, the following signatures will be obtained and the area certified 3X.

**Verification of above Results:**

\_\_\_\_\_  
**QA/QC BRANCH**

**Certification of 3X level of area or item:**

\_\_\_\_\_  
**SURVEILLANCE**

\_\_\_\_\_  
**SAFETY MANAGER**

\_\_\_\_\_  
**DATE**

\_\_\_\_\_  
**DATE**

\_\_\_\_\_  
**DATE**

**NOTE:** When this document is completed and signed a copy will be given to Plants, Surveillance, Data Collectors, and Safety. The original will be retained by the QA/QC Section.

**FORM 2**

**APPENDIX C**  
**ACRONYMS AND ABBREVIATIONS**

## **ACRONYMS AND ABBREVIATIONS**

≥	Equal To Or Greater Than
<	Less Than
%	Percentage
ATF	Auxiliary Test Facility
CFR	Code Of Federal Regulations
DAAMS	Depot Area Air Monitoring System
DCD	Deseret Chemical Depot
DPE	Demilitarization Protective Ensembles
DWS	Drinking Water Standards
OSHA	Occupational Safety And Health Administration
PFTE	Polytetrafluoroethylene
ppm	Parts Per Million
RCRA	Resource Conservation And Recovery Act
SOP	Standing Operating Procedure
TWA	Time Weighted Average
USACAMDS	U.S. Army Chemical Agent Munitions Disposal System